What is claimed is:

1. A method for processing a substrate, comprising:

reacting an organosilicon compound selected from the group consisting of dimethylsilanediol, diphenylsilanediol, dimethyldimethoxysilane, diethyldiethoxysilane, dimethyldiethoxysilane, diethyldimethoxysilane, 1,3-dimethyldisiloxane, 1,1,3,3-tetramethyldisiloxane, hexamethyldisiloxane, 1,3-bis(silanomethylene)disiloxane, bis(1-methyldisiloxanyl)methane, 2,2-bis(1-methyldisiloxanyl)propane, 1,3,5,7-tetramethylcyclotetrasiloxane, octamethylcyclotetrasiloxane, 1,3,5,7,9-pentamethylcyclopentasiloxane, 1,3,5,7-tetrasilano-2,6-dioxy-4,8-dimethylene, 1,3,5-trisilanetetrahydropyran, and 2,5-disilanetetrahydrofuran to deposit a dielectric layer comprising silicon, oxygen, and carbon on the substrate; and

depositing a layer comprising silicon, carbon, and hydrogen on the dielectric layer.

2. The method of claim 1, wherein the organosilicon compound is octamethylcyclotetrasiloxane.

3. The method of claim 1, wherein the layer comprising silicon, carbon, and hydrogen is deposited from a gas mixture comprising a compound selected from the group consisting of methylsilane, dimethysilane, trimethylsilane, diethylsilane, propylsilane, vinylmethylsilane, 1,1,2,2-tetramethyldisilane, hexamethyldisilane, 1,1,2,2,3,3-hexamethyltrisilane, 1,1,2,3,3-pentamethyltrisilane, dimethyldisilanoethane, dimethyldisilanopropane, tetramethyldisilanoethane, and tetramethyldisilanopropane.

4. The method of claim 1, wherein the layer comprising silicon, carbon, and hydrogen further comprises a dopant and is deposited from a gas mixture comprising the dopant.

5. The method of claim 4, wherein the gas mixture further comprises a silicon source, and the ratio of the silicon source to the dopant in the gas mixture is between about 1:1 to about 1:100.

6. The method of claim 1, wherein the organosilicon compound is reacted in the absence of an oxidizer other than the organosilicon compound.

7. The method of claim 1, wherein the layer comprising silicon, carbon, and hydrogen is deposited by a plasma process.

8. The method of claim 1, wherein the dielectric layer has a dielectric constant of about 3 or less.

9. A method for processing a substrate, comprising:

reacting a gas mixture comprising an organosilicon compound selected from the group consisting of methylsilane, dimethylsilane, trimethylsilane, tetramethylsilane, dimethylsilanediol, ethylsilane, phenylsilane, diphenylsilane, diphenylsilanediol, methylphenylsilane, disilanomethane, bis(methylsilano)methane, 1,2-disilanoethane, 1,2-bis(methylsilano)ethane, 2,2-disilanopropane, 1,3,5-trisilano-2,4,6-trimethylene, dimethyldimethoxysilane, diethyldiethoxysilane, dimethyldiethoxysilane, diethyldimethoxysilane, 1,3-dimethyldisiloxane, 1,1,3,3-tetramethyldisiloxane, hexamethyldisiloxane, 1,3-bis(silanomethylene)disiloxane, bis(1-methyldisiloxanyl)methane, 2,2-bis(1-methyldisiloxanyl)propane, 1,3,5,7-tetramethylcyclotetrasiloxane, octamethylcyclotetrasiloxane, 1,3,5,7,9-pentamethylcyclopentasiloxane, 1,3,5,7-tetrasilano-2,6-dioxy-4,8-dimethylene, 1,3,5-trisilanetetrahydropyran, and 2,5-disilanetetrahydrofuran, to deposit a dielectric layer comprising silicon, oxygen, and carbon on the substrate, wherein the dielectric layer has a carbon content of at least 1% by atomic weight and a dielectric constant of less than about 3; and

depositing an oxygen doped silicon carbide layer on the dielectric layer by reacting an alkylsilane and oxygen in a plasma of an inert gas.

10. The method of claim 9, wherein the gas mixture further comprises an oxidizing gas.

11. The method of claim 10, wherein the oxidizing gas is selected from the group consisting of oxygen (O_2), ozone (O_3), nitrous oxide (N_2O), carbon monoxide (CO), carbon dioxide (CO_2), water (H_2O), and combinations thereof.

12. The method of claim 9, wherein the alkylsilane is selected from the group consisting of methylsilane, dimethysilane, trimethylsilane, diethylsilane, propylsilane, vinylmethylsilane, 1,1,2,2-tetramethyldisilane, hexamethyldisilane, 1,1,2,2,3,3-hexamethyltrisilane, 1,1,2,3,3-pentamethyltrisilane, dimethyldisilanoethane, dimethyldisilanopropane, tetramethyldisilanoethane, and tetramethyldisilanopropane.

13. The method of claim 9, wherein the inert gas is selected from the group consisting of helium, argon, and nitrogen.

14. The method of claim 9, wherein the plasma is formed at between about 0.3 W/cm^2 and about 3.2 W/cm^2.

15. A method for processing a substrate, comprising:

reacting an organosilicon compound selected from the group consisting of dimethylsilanediol, diphenylsilanediol, dimethyldimethoxysilane, diethyldiethoxysilane, dimethyldiethoxysilane, diethyldimethoxysilane, 1,3-dimethyldisiloxane, 1,1,3,3-tetramethyldisiloxane, hexamethyldisiloxane, 1,3-bis(silanomethylene)disiloxane, bis(1-methyldisiloxanyl)methane, 2,2-bis(1-methyldisiloxanyl)propane, 1,3,5,7-tetramethylcyclotetrasiloxane, octamethylcyclotetrasiloxane, 1,3,5,7,9-pentamethylcyclopentasiloxane, 1,3,5,7-tetrasilano-2,6-dioxy-4,8-dimethylene, 1,3,5-trisilanetetrahydropyran, and 2,5-disilanetetrahydrofuran to deposit a dielectric layer comprising silicon, oxygen, and carbon on the substrate; and

depositing an oxygen doped silicon carbide layer on the dielectric layer.

16. The method of claim 15, wherein the organosilicon compound is octamethylcyclotetrasiloxane.

17. The method of claim 15, wherein the oxygen doped silicon carbide layer is deposited from a gas mixture comprising oxygen and a compound selected from the group consisting of methylsilane, dimethysilane, trimethylsilane, diethylsilane, propylsilane, vinylmethylsilane, 1,1,2,2-tetramethyldisilane, hexamethyldisilane, 1,1,2,2,3,3-hexamethyltrisilane, 1,1,2,3,3-pentamethyltrisilane, dimethyldisilanoethane, dimethyldisilanopropane, tetramethyldisilanoethane, and tetramethyldisilanopropane.

18. The method of claim 15, wherein the organosilicon compound is reacted in the absence of an oxidizer other than the organosilicon compound.

19. The method of claim 15, the oxygen doped silicon carbide layer is deposited by a plasma process.

20. The method of claim 15, wherein the dielectric layer has a dielectric constant of about 3 or less.